A Clinical Study on Evaluation of Extracapsular Cataract Surgery in Canines

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Abstract
Cataracts are the most frequent cause of blindness in dogs which are characterised by a focal or diffused opacity of lens or lens capsule. Present clinical study was conducted on 12 dogs suffering from cataract. After the detailed ophthalmic and ultrasonographic examination, 7 (9 eyes) out of 12 dogs were surgically treated by extracapsular lens extraction method using operating microscope. The return of ambulatory vision was observed in 6 eyes out of 9 operated eyes and failure of vision was noted in 3 eyes. Peri-operative complications such as haemorrhage, meiosis and iris prolapse and post-operative complications such as posterior capsule opacity, suture breakage and glaucoma were reported. Higher incidence of cataract was noted in German shepherd (33.33%) followed by Pomeranian (25%), Cocker spaniel (16.67%), Mongrel (16.67%) and Spitz (8.33%). In this study it was found that extracapsular cataract extraction under general anesthesia along with retrobulbar nerve block is proved to be an effective method to treat the cataract.

Key words: Cataract, Extracapsular Lens Extraction Method, Operating Microscope


Introduction
The eye is one of the most important sense organ associated with vision. The lens is a unique structure and has a protein concentration of 33% of its total weight; and most of these proteins are transparent and water soluble (Hart 1992 and Shahzad et al., 2012). Cataract, the opacity of crystalline lens is regarded as
major cause of blindness in dogs (Magrane 1961) affecting thousands of dogs annually (Davidson and Keil 2001). Many different processes can cause cataract and they may progress at a variable rate. Loss of vision due to cataract may be accompanied by secondary conditions such as uveitis and glaucoma (Gelatt 1981).

The age of onset of cataract is variable, usually from 5-8 years of age. In some breeds, cataracts appear at higher frequency than the general population. Commonly affected breeds of dog include the American cocker spaniel, Poodle, Boston terrier, Miniature schnauzer, Bichon frise, and Labrador retriever (Cook 2008). There are numerous causes of cataract. Common etiologies are categorised as heritable (genetic) disorders, senile (age related) degeneration, congenital (birth defects), traumatic (capsule rupture), toxic reaction in the lens (progressive retinal degeneration, uveitis and glaucoma) geographical location (UV light), nutritional (deficiency of an amino acid – arginine etc.), metabolic diseases (diabetes etc.) and electricity (electric shock during bites on wires) (Patil et al., 2014). Diagnosis of cataract involves systemic and ophthalmic examinations such as assessment of vision (menace test and obstacle course test), reflex test (pupillary light reflex and corneal reflex) and ultrasonographic examination of eye (Mustafa et al., 2014). Treatment of cataract in dogs can be either medical or surgical but surgical treatment is regarded as the most promising treatment for cataract in dogs (Startup 1967 and Whiltely et al., 1993). In the early days, the success rate for the cataract operations were relatively low (Startup 1967) but more recently the surgery has been accomplished successfully in over 95 % cases of cataract (Davidson et al., 1991), but in 5% cases complications may prevent recovery of vision.

Extracapsular cataract extraction (ECCE) is an effective and most economical procedure of lens extraction and is preferred worldwide by many ophthalmic surgeons (Williams et al., 2004) and regarded as method of choice by veterinary ophthalmologists (Gelatt 1981).

Materials and Methods
In the present clinical study 12 cases of canine cataract included during a period of six months, which were presented at the Department of Veterinary Surgery and Radiology, Bikaner (Rajasthan). History pertaining to age, sex, breed, eye affected, vision changes, any injury to eye, time elapsed since occurrence of opacity and use of recent medications and presence of diabetes was recorded. The affected eyes were checked for clarity of cornea, opacity of lens, type of cataract (immature, mature [Fig. 1a] and hypermature [Fig. 1b]), conjunctival appearance, conjunctival vascularity and discharge if any. Detailed ophthalmic examinations of all the 12 cases (24 eyes) were carried out by the assessment of vision (Menace test), reflex test (Pupillary light reflex test and Corneal reflex test) and ultrasonographic examination.

Different Types of Cases of Cataract in Dogs
Considering the history about the vision obtained and the observations made during the detailed ophthalmic examinations of the patient, 9 eyes from 7 dogs were subjected to ECCE as per the method described by Gelatt and Gelatt (2001) (Fig. 2a-Fig. 2f) under general anaesthesia (injection Ketamine @10mg/kg i/m and inj. Xylazine @1mg/kg i/m) using operative microscope.

**Surgical Procedure of Extracapsular Cataract Extraction (ECCE) Method**

**Fig. 1a**: Mature cataract in a Mongrel dog  
**Fig. 1b**: Hypermature cataract Cocker spaniel dog with glaucoma

**Fig.2a**: Incision on cornea with Keratotome  
**Fig.2b**: Staining of anterior lens capsule by trypan blue dye

**Fig.2c**: Injection of viscoelastic material  
**Fig. 2d**: Removal of hypermature cataractous lens

**Fig.2e**: Suturing of cornea with 8/0 absorbable suture material  
**Fig.2f**: Recovered cataractous lenses
In this method a stab incision was made with the help of keratotome knife on cornea at 2 O' clock position and 0.2 ml Trypan blue dye was injected into the anterior chamber that stained the anterior lens capsule. After 30 seconds dye was washed with the normal saline solution and viscomet was filled in the anterior chamber of the eye. The anterior capsulotomy was done by “can opener” method using 24 G double bended hypodermic needle. Incision was extended to 1 and 3 O'clock position using corneal scissors by full thickness cut circumferentially. Lens was extracted with manual counter pressure at opposite poles of limbus using muscle hook and lens scooper. Then irrigation of anterior chamber was done by Simcoe’s irrigation aspiration cannula to remove out small pieces of capsule or cortical material. Corneal incision was closed with 8/0 absorbable suture material using simple interrupted suture. After completion of the surgery subconjunctival injection of Gentamicin (0.5 ml) and Dexamethasone (0.5 ml) was given using 24 G needle. Eye lids were closed by horizontal mattress suture to protect the eye (Gelatt and Gelatt, 2001). Post-operative follow-up of all the cases was done weekly, upto four weeks. Surgical outcome was graded as based on parameters (good, fair and failure) as reported earlier by Patil et al., 2014. The eye which had minimal corneal opacity, normal shaped cornea, minimal incisional scar, round pupil with presence of pupillary light reflex, minimal adhesions, almost clear posterior capsule and no residual cortex, four weeks after the cataract surgery considered as good surgical result and the eye in which good surgical result was hampered by some postoperative complications, sufficient to prevent restoration of good vision but not as great as to necessitate the loss of the eye or to result in total blindness considered as fair surgical result. Failure of the surgery was considered as total corneal opacity, secondary glaucoma and severe postoperative complications following the surgery.

Results and Discussion

In the present study, out of 12 cases of dogs, German shepherd dogs had higher incidence of cataract (33.33 %) followed by Pomeranian (25.00 %), Cocker spaniel (16.67 %), Mongrel (16.67 %) and Spitz (08.33 %). Whitley (1988) had also opinioned the higher susceptibility of Cocker spaniel, German shepherd, Poodle, Schnauzer, Labrador retriever, Lhasa apso and Dalmatian breeds of dog to cataract. The average age of the affected dogs was observed as 6.64 years. Williams et al., 2004 reported that old age dogs had higher prevalence of cataract and after 13.5 years of age all dogs had some degree of lens opacity. Unilateral cataract was observed only in 3 cases out of 12 (25 %), while rest of the 9 cases (75 %) had bilateral involvement of the eyes. Barnett (1980) had recorded hereditary cataracts in different breeds with bilateral involvement.

In the ophthalmic examination of 24 eyes; 7 eyes showed positive menace reflex test and corneal reflex test, 16 eyes showed negative menace reflex test and corneal reflex test and 1 eye showed sluggish menace reflex test and corneal reflex test. For pupillary light reflex test 11 eyes showed positive reflex, 12 eyes showed negative reflex and 1 eyes showed sluggish reflex. In ultrasonographic examinations 21 eyes
showed hyperechogenicity of lens because of cataract while 3 eyes that were normal showed the anechogenicity of lens. The inbuilt light source of operating microscope was used for the illumination during all the surgeries. Startup (1967) stated that, the illumination was highly important during the cataract surgery. Incision from 10 O’clock to 2 O’clock on dorsal circumference through anterior clear cornea was observed as a good incision site. Iris prolapse was observed intra-operatively only in one eye which was easily repositioned during the surgery.

Trypan blue dye was used to stain the anterior capsule of lens before anterior capsulotomy. Chung et al., 2005 had used trypan blue 1% safely for assisting visualisation of the anterior capsule during phaco-emulsification of mature cataract. Viscoelastic material was good in maintaining the anterior chamber space during intraocular manipulations and protected non-regenerative corneal endothelium by coating it. Whitley (1988) had mentioned the use of this material to protect the corneal endothelium during the intraocular surgery. The delivery of the lens nucleus with vectis was smooth in all cases, but some amount of cortical material remained in the anterior chamber, which was removed successfully with the irrigation-aspiration cannula using Ringer’s lactate solution. Ameerjan (2005) advised to remove cataractous lens with the help of vectis and recommended that closure of anterior chamber can be done with absorbable suture material polyglactin 910 and polyglycolic acid or non-absorbable suture like nylon and prolene 10/0.

Perioperatively, haemorrhage and meiosis were observed in one case each and postoperative complications such as posterior capsular opacity, suture breakage, corneal edema and iris prolapse were observed in 3 cases after ECCE. Collinson and Peiffer (2002) reported that failures of manual extracapsular surgical procedures were more commonly associated with postoperative synechia and glaucoma, compared with failures of phacoemulsification, which, were more commonly associated with infection and haematogenous retinal detachments. Jhala et al., 2009 reported the postoperative complications such as corneal opacity, corneal edema, posterior capsular opacity and uveitis. Joy et al., 2011 also reported corneal edema, corneal opacity, suture dehiscence and subsequent iris prolapse was usually met in dogs with poor owner compliance.

Return of vision was not observed in most of the cases at the end of first week but in two cases owners reported improvement in the activities of dogs. Startup (1967) had mentioned that a variable period of adjustment of vision was required following the cataract surgery. Good surgical result (Fig.3) was observed in 44.44 % operated eyes (4 out of 9 eyes), fair result was seen in 22.22 % operated eyes (2 out of 9 eyes) and failure was noted in 33.33 % (3 out of 9 eyes). Spruell et al., 1980 got satisfactory outcome in 75% of the cases operated by extracapsular cataract extraction method. However, Whitley et al., 1993 recorded 90% success rate and stated that extracapsular lens extraction method would be a more successful procedure for cataract surgery for veterinarians with less experience of
microsurgery with lack of advanced instruments and owners with less spending willingness for their cataractous dogs.

![After 1st week](image1)
![After 2nd week](image2)
![After 4th week](image3)

**Fig3**: Postoperative follow up images of operated case at 1st, 2nd and 4th week

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**References**


